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United States Peanut Descriptors



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ABSTRACT

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This text revises the original descriptors used in the peanut germplasm catalogs published by the S-9 Plant Germplasm Collection and Utilization Regional Project in 1963, 1976, and 1985. It shows the descriptor system as of 1995 used by the cultivated-peanut breeders in the United States to characterize, evaluate, and describe the peanut collection. These descriptors define characters that have been identified by the U.S. peanut-breeding community as important to the description or identification of the accession. The characterization of peanut germplasm is divided into four groups of traits: plant; pod; seed; and disease, pest, or stress. The availability of data describing conserved germplasm will aid administrators, curators, and users in monitoring inventories and seed germination, tracking requests for and shipping germplasm, assessing genetic diversity in the collections, selecting material for use, and coordinating activities between collections. Although the suggested coding should not be regarded as definitive, the format has the approval of the Genetic Resources Information Network and the Peanut Crop Germplasm Committee.

Keywords: groundnut, *Arachis hypogaea*, trait characterization, trait evaluation

While supplies last, single copies of this publication may be obtained at no cost from Dr. Roy N. Pittman, USDA-ARS Georgia Experiment Station, 1109 Experiment St., Griffin, GA, 30223-1797.

Copies of this publication may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

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UNITED STATES PEANUT DESCRIPTORS

Roy N. Pittman, Editor

This text shows the descriptor system used by cultivated-peanut breeders in the United States to characterize and describe the peanut collection. The information is an updated list of descriptors for the morphological and physiological traits of cultivated peanut (*Arachis hypogaea* L.) germplasm. It is well recognized that information related to plant genetic resources increases the usefulness of these resources to potential users.

The Plant Exploration Office of the U.S. Department of Agriculture, Agricultural Research Service, coordinates the collecting of peanut germplasm from foreign countries. The curator is responsible for the working collection—namely, the evaluation, characterization, maintenance, and documentation of the germplasm. Plants are observed during the year of seed multiplication; when possible, the agronomic characteristics, disease resistance, and other desirable genetic characters are collected. Although the suggested coding should not be regarded as definitive, this format has the approval of the Genetic Resources Information Network and the Peanut Crop Germplasm Committee.

This characterization of the U.S. peanut germplasm for the selected four trait groups was undertaken with the following objectives:

- To assist breeders and other researchers in identifying accessions for specific traits
- To facilitate the use of selected germplasm in crop-improvement programs
- To designate and set up a core collection
- To provide evidence for removal of duplicates
- To identify gaps in an existing collection
- To formulate strategies for future collection and conservation.

The availability of reliable accession-specific information generally increases the accessibility, use, and cost-effective conservation of genetic resources.

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I. Plant Traits

The traits of peanut plants fall into four main categories: prostrate, spreading, bunch, and erect. These traits are illustrated in figures 1–4.

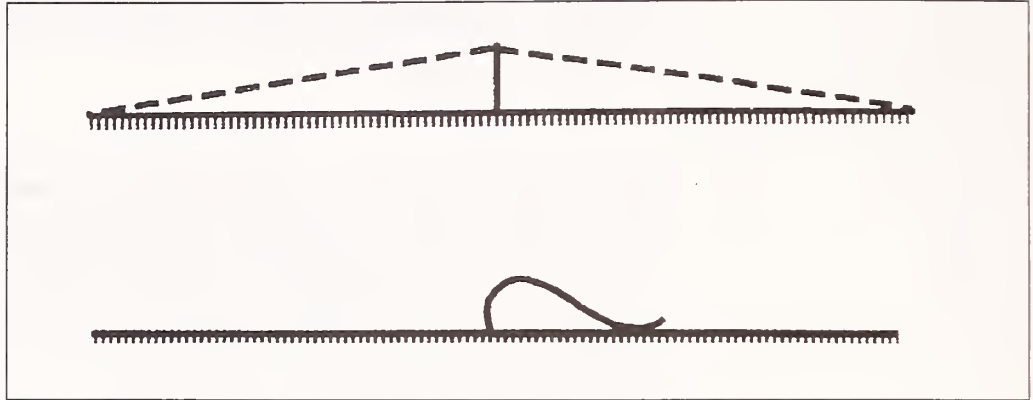


Figure 1. Prostrate growth habit of peanut plant. Main stem may be erect or decumbent late in the growing season. Examples are PI 468196 and PI 497260.

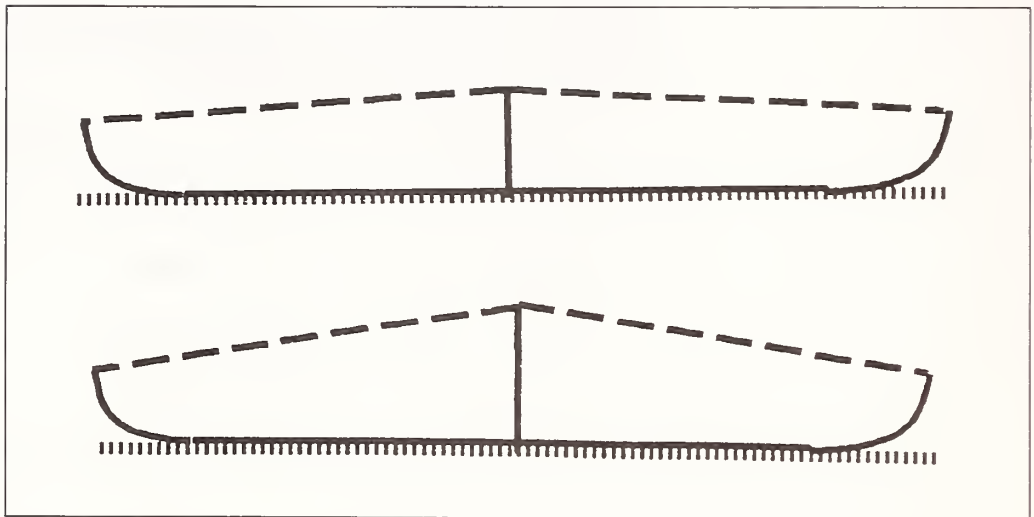


Figure 2. Spreading growth habit of peanut plant. Main stem may be slightly taller or taller than curved-up branches at tips. Examples are PI 565445 and PI 565448.

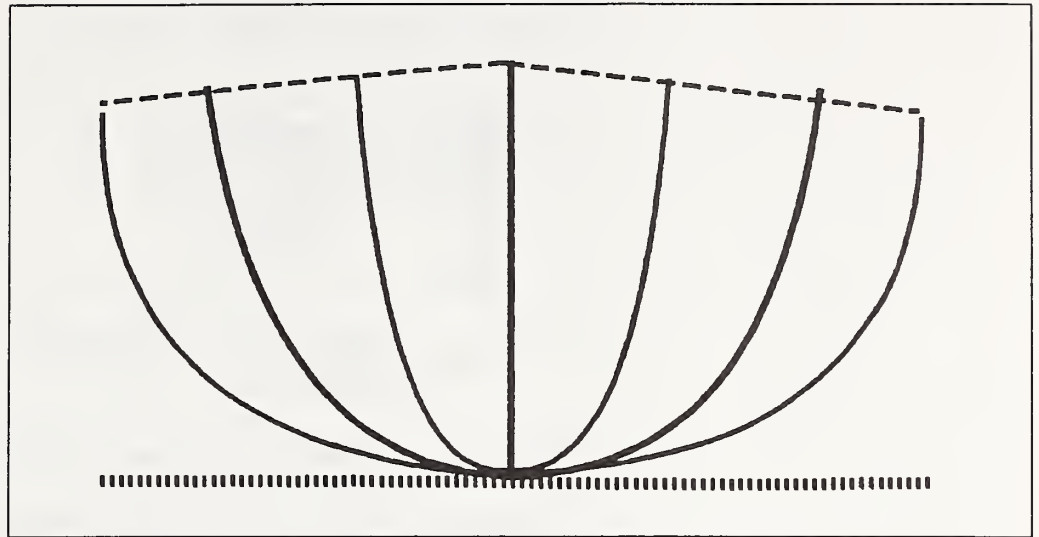


Figure 3. Bunch growth habit of peanut plant. Branches curve up from base. Examples are PI 565459 and PI 565463.

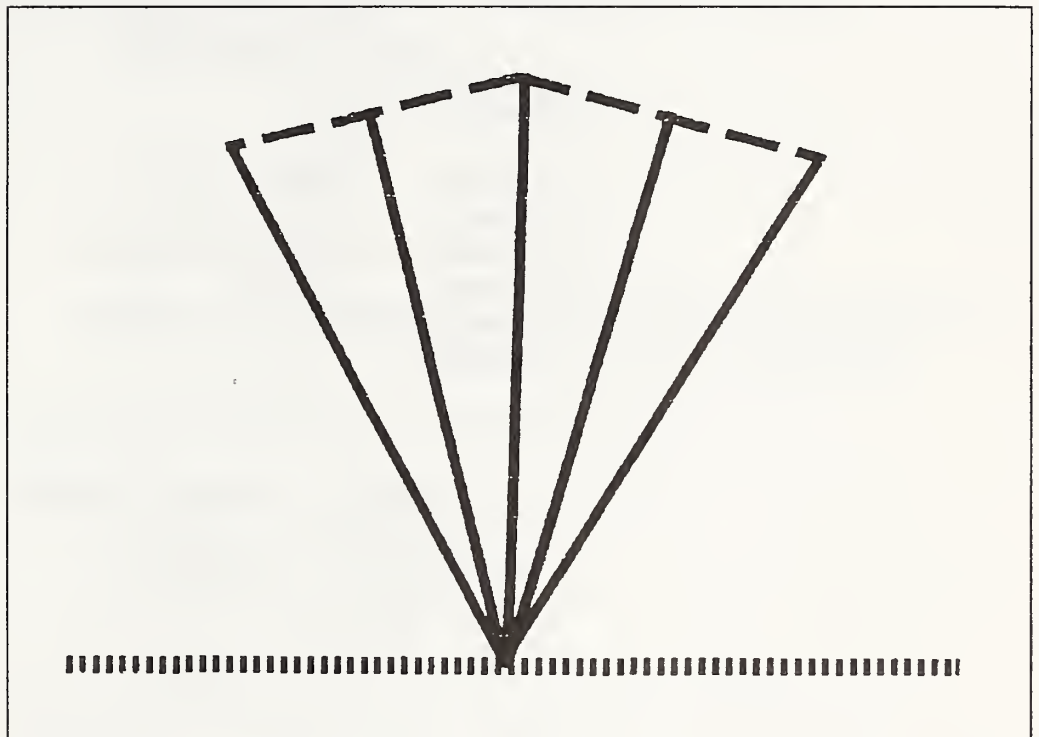


Figure 4. Erect growth habit of peanut plant. Branches come straight up from base and are generally 45° or less from vertical. Examples are PI 565452 and PI 565475.

A. Growth Habit (at 60–70 Days)

1. Prostrate (See fig. 1.)
2. Spreading (See fig. 2.)
3. Spreading and bunch
4. Bunch (See fig. 3.)
5. Erect (See fig. 4.)
6. Mixed

Method: Classify at 60–70 days after planting, before the plants touch between rows.

Prostrate: Creeping size, with branches sticking to the ground

Spreading: Creeping or semicreeping, branches partially on the ground; tips of branches curved upward; branching

Bunch: Semierect, branches curved upward, beginning at the base; height intermediate between spreading and erect; branching scarce to prolific and compact; height of the main stem slightly prominent in relation to other branches

Erect: Branches erect, starting at the base, sometimes slightly curved; main stem of these plants normally higher than that of bunch-type plants

B. Plant Size (at Harvest)

1. Dwarf: PI 362129
2. Small: PI 565455
3. Medium: PI 565443, PI 565458
4. Large: PI 565445
5. Extra large: PI 196695, PI 468248
6. Mixed

C. Main Stem (at 60–90 Days)

1. Not apparent: PI 565458, PI 565474
2. Somewhat apparent: PI 565443
3. Apparent: PI 565448
4. Mixed

D. Main Stem (at Harvest)

1. Not apparent
2. Somewhat apparent
3. Apparent
4. Mixed

E. Flowers on Main Axis (at 60–90 Days)

1. No: PI 565459
2. Yes: PI 565443, PI 565455
3. Mixed plots

F. Leaf Color (at 60–90 Days)

1. Very light green: 144A RHS,* PI 565455
2. Light green: 146A RHS, PI 565443
3. Green: 137A RHS, PI 565445
4. Dark green: PI 280688
5. Very dark green: 139A RHS, PI 269114,
PI 565460
6. Mixed
7. Other colors (Describe. Examples: Variegated or golden)

G. Stem Pigmentation (at 60–90 Days)

1. Green: PI 268661
2. Purple: PI 280688
3. Mixed
4. Other (Describe. Example: White)

Method: Notes should be taken from the main stem location nearest the ground. The stem pigmentation is usually green or purple.

H. Maturity (at Harvest)

1. Very early: PI 268661
2. Early: PI 565443
3. Medium: PI 565445, PI 565448
4. Late: PI 506419
5. Very late: PI 383421
6. Mixed

*Royal Horticulture Society color chart

II. Pod Traits

The pod traits are shape, constriction, and reticulation. Figures 5–9 show the various pod shapes.



Figure 5. Pod shape of PI 565443 (*Vulgaris*). Generally two seeds per pod with a slight beak possible. Pods have a slight-to-moderate constriction and slight reticulation.



Figure 6. Pod shape of PI 565452 (*Fastigiata*). Generally three or more seeds per pod with a slight beak possible. Pods have a slight constriction and slight reticulation.



Figure 7. Pod shape of PI 497631 (Peruviana). Generally three or more seeds per pod with a slight-to-moderate beak possible. Pods have a slight constriction and prominent-to-very-prominent reticulation.



Figure 8. Pod shape of PI 565445 (Hypogaea). Generally two seeds per pod with a slight beak possible. Pods have a slight-to-moderate constriction and slight-to-moderate reticulation.



Figure 9. Pod shape of PI 280688 (Hirsuta). Generally two or three seeds per pod with a moderate-to-prominent beak possible. Pods have a moderate-to-very-deep constriction and very prominent reticulation. It is common to have a crook between the second and third seed segments.

A. Pod Shape (at Harvest)

1. Vulgaris: PI 565443 (See fig. 5.)
2. Fastigiata: PI 565452 (See fig. 6.)
3. Peruviana: PI 262129, PI 497631, PI 590455 (See fig. 7.)
4. Hypogaea: PI 565445, PI 565448 (See fig. 8.)
5. Hirsuta: PI 280688 (See fig. 9.)
6. Mixed
7. Other (Describe.)

B. Pod Constriction (at Harvest)

Various degrees of pod constriction are shown in figure 10.

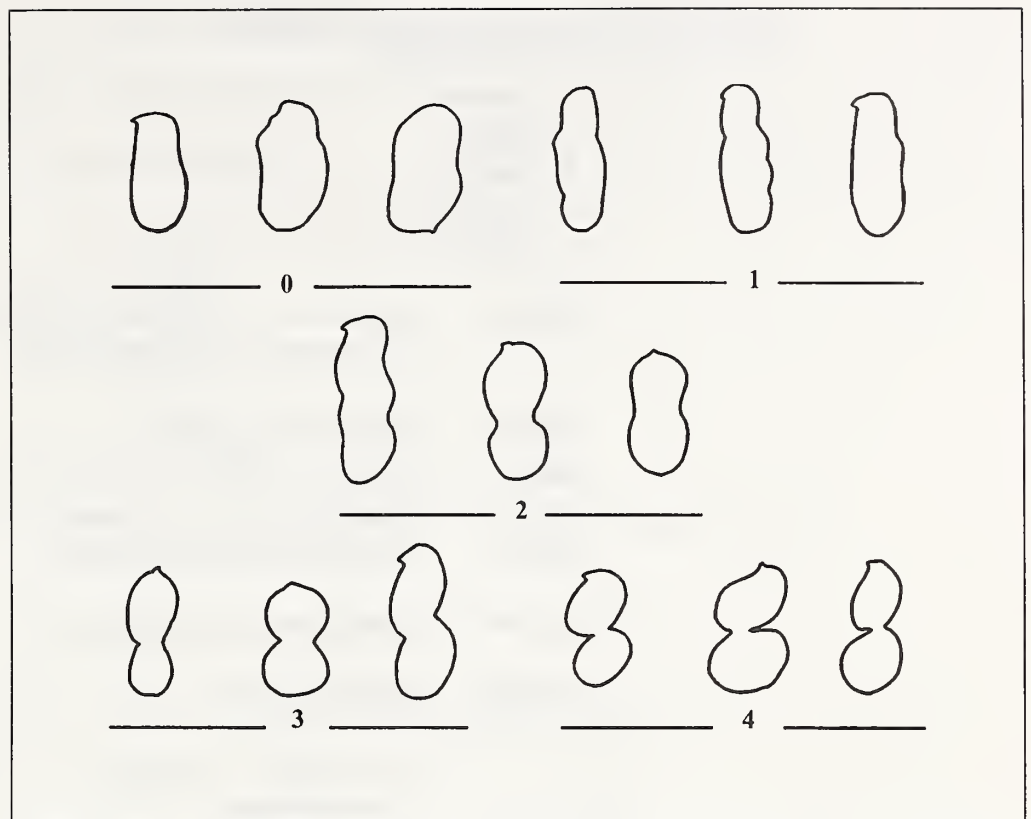


Figure 10. Pod constrictions

- | | |
|---------------|------------------------------------|
| 0. None: | PI 475871 |
| 1. Slight: | PI 497374, PI 565448, or PI 565452 |
| 2. Moderate: | PI 565443 |
| 3. Deep: | PI 497365 |
| 4. Very deep: | PI 497415 |
| 5. Mixed | |
| 6. Other | (Describe.) |

Method: Refers to degree of depth of strangulation found between the regions of the shell where seeds are located.

None: Almost no constriction

Slight: Slight constriction

Moderate: Visible but shallow strangulation

Deep: Visible and deep strangulation

Very deep: Fruits almost separated at region of constriction

C. Pod Reticulation (at Harvest)

1. Smooth
2. Slight
3. Moderate
4. Rough
5. Mixed

Method: Appearance of veins on outside surface of shell.
Consider the average type of fruit.

Smooth: Surface almost smooth

Slight: Reticulation visible but almost smooth

Moderate: Reticulation visible with moderate depth

Rough: Reticulation visible and deep

D. Seed Per Pod (Most common number is 1–5.)

Example: 2100: PI 565443

2 = First most

1 = Second most

0 = Third most

0 = Fourth most

Method: Select at random at least 20 fruits. Note in decreasing frequency the number of seeds per pod.

E. Pod Weight (nearest gram/100 mature pods)

F. U.S. Pod Market Type

1. Spanish: PI 565475
2. Valencia: PI 565452
3. Runner: PI 565448
4. Virginia: PI 565459
5. Mixed

III. Seed Traits

A. Seed Coat Color Pattern (at Harvest)

0. Secondary testa pattern
1. Single testa color
2. Striped (flecked)
3. Variegated or bicolor
4. Mixed plot
5. Other (Describe.)

Striped (flecked): A line, mark, or smear differentiated by color from its surrounding color

Variegated (bicolor): Two colors

B. Seed Coat Color

0. No secondary or tertiary color

1. White

2. Tan

3. Pink

4. Red

5. Purple

6. Dark purple

Explanation of coding to combine seed coat color pattern and seed coat color information:

10200 Color information for PI 565455
└──┬──┘
 └──┘ Seed coat color(s) (See B.)
 └──┘ Seed coat color pattern(s) (See A.)

Examples:

10100	White	=	PI 476063
10200	Tan	=	PI 476179
10300	Pink	=	PI 565474
10400	Red	=	PI 371965
10400	Red	=	PI 476181
10400	Red	=	PI 497415
10500	Purple	=	PI 476163
10600	Dark purple	=	PI 331334
30210	Variegated	=	PI 274191
30210	Variegated	=	PI 467222
30210	Variegated	=	PI 497365
20250	Striped	=	PI 262129
20250	Striped	=	PI 476146

C. Seed Weight (nearest gram/100 mature seeds)

IV. Factors for Rating Disease, Pests, or Stress (scale of 1–9)

1. Very highly resistant (immune)
2. Highly resistant
3. Moderately resistant
4. Slightly resistant
5. Intermediate
6. Slightly susceptible
7. Moderately susceptible
8. Highly susceptible
9. Very highly susceptible (dead)

V. Peanuts Used as Standards

Cultivar or Collection Number	PI No.	Cultivar or Collection Number	PI No.
BPZ 53	468248	NC 7	565459
BPZHa 706–7	497631	New Mexico Valencia A	565452
Bayo Americana	497365	PZa 614–3	497302
Chico	565455	Peru No. 9	262129
Criollo	331334	Pronto	565475
Early Bunch	565458	RCM 384	274191
Florigiant	565445	Rosado Grande	468242
Florunner	565448	S 540	476063
GKBSPSc 2	468190	SPZ 454–1	502014
GKBSPSc 27	468222	SPZ 471–1	502045
GKSPSc 224	475871	SPZ 487–2	502089
Guanajuato-2	280688	SPZ 489	476181
Gujarat Dwarf	362129	Southern Runner	506419
IN59–31	269114	Starr	565443
KSSc 812	497374	Tifton 8	565463
KSScCo 828–2	497415	US 1359	590455
Mount Makulu Red	371965	Virginia 81 Bunch	565474
NC 3033	565460		

VI. Examples of Collected Data

Table 1. Sample of data collected using new descriptors

Descriptor	Plant Introduction Number			
	265970	270797	318734	319722
Growth habit (at 60 days)	3	2	5	2
Plant size (at harvest)	.*	.	.	.
Main stem (at 60 days)	1	3	3	2
Main stem (at harvest)
Flowers main stem (at 60 days)	1	1	1	1
Leaf color (at 60 days)	3	3	2	3
Stem pigmentation (at 60 days)	1	2	1	1
Maturity (at harvest)
Pod shape	1	2	4	6
Pod constriction	3	1	2	5
Pod reticulation	3	2	3	5
Seed or pod	2130	2341	2100	2310
Pod weight	126	160	127	108
U.S. pod market type	3	2	4	5
Testa color	10200	10400	10300	10300
Seed weight	67	54	68	46

* No data collected

